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**Miwa et al.**

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(54) **PRINTED CIRCUIT BOARD CONNECTOR**

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(51) **Int. Cl.<sup>7</sup>** ..... **H01R 12/00**

(52) **U.S. Cl.** ..... **439/79; 439/942**

(58) **Field of Search** ..... 439/79, 80, 81, 439/83, 942

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(57) **ABSTRACT**

A printed circuit board connector **10** has a plurality of terminals **3** which connect the connector **10** to a printer circuit board and protrude outside from a rear wall surface **12a** of a connector housing **12**. Tip end portions of the terminals are bent into an L shape in parallel to the rear wall surface **12a** and thereby aligned. A terminal cover **20** is detachably attached to the connector housing **12** so as to cover the terminals **3** and a tip end of an insulating wall **22** provided on the terminal cover **20** is fitted into a groove **15** formed in the rear wall surface **12a**, whereby distances among adjacent terminals **3** can be widened and the insulation performance among the terminals **3** can be enhanced.

**3 Claims, 3 Drawing Sheets**

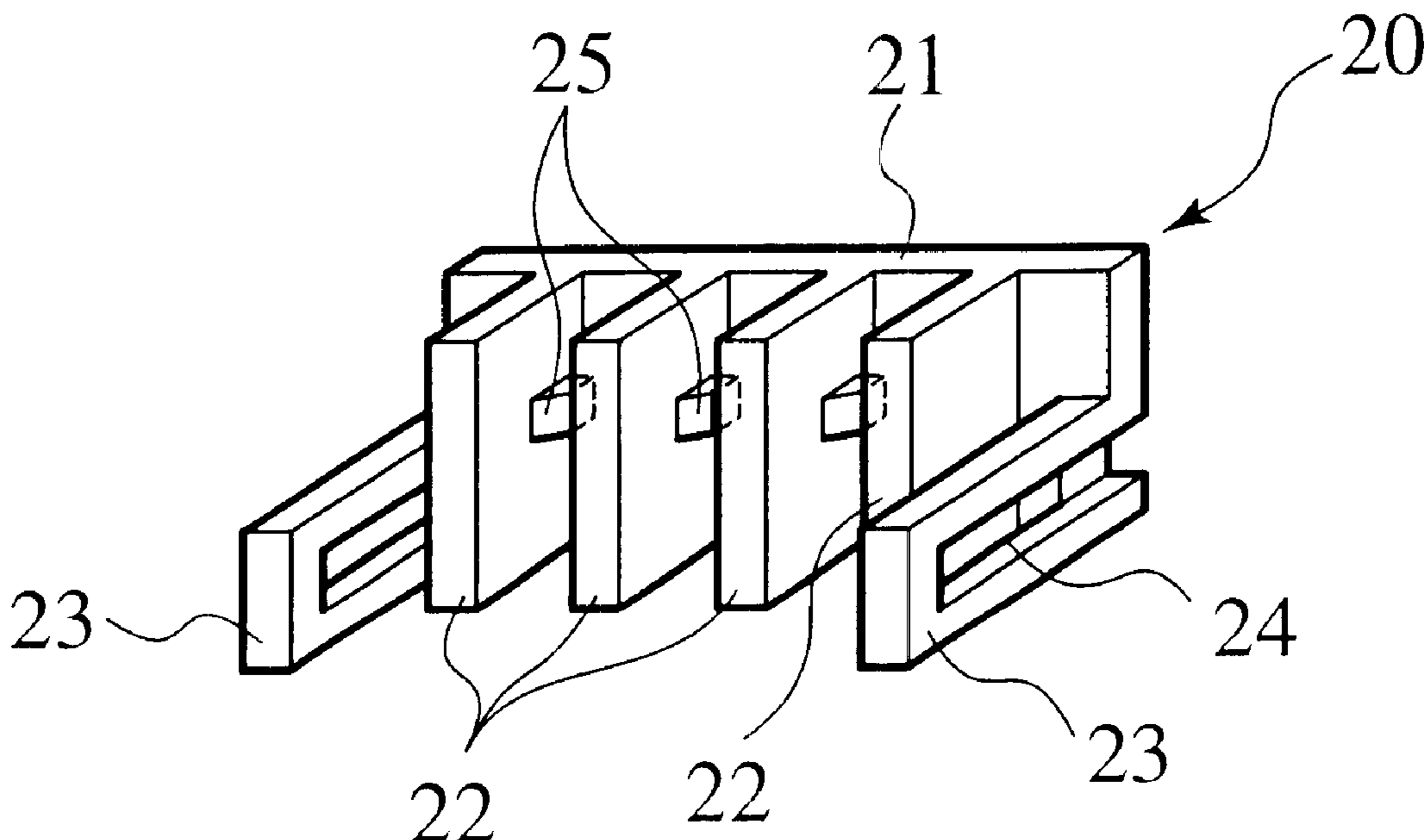


FIG. 1  
PRIOR ART

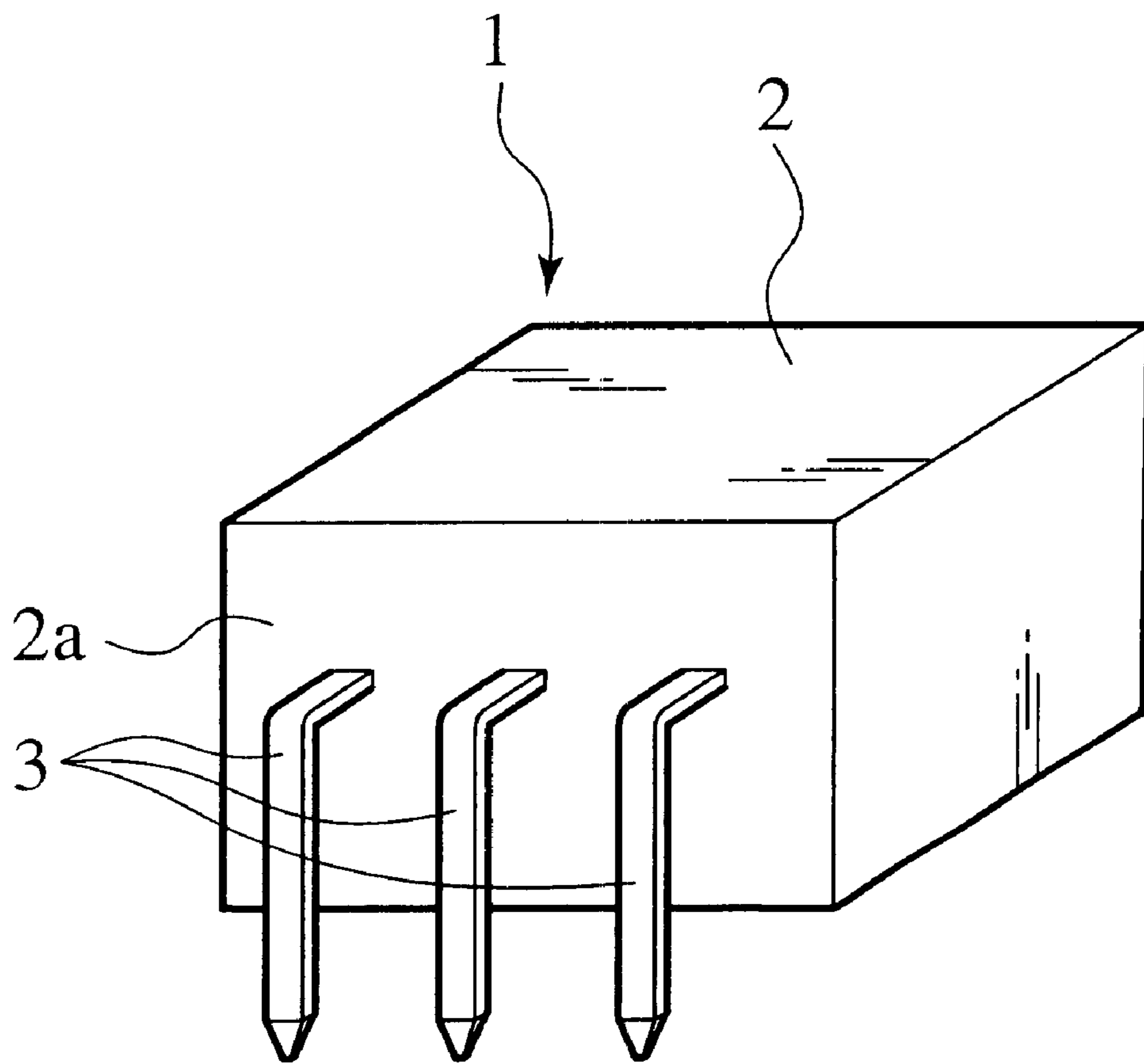


FIG.2A

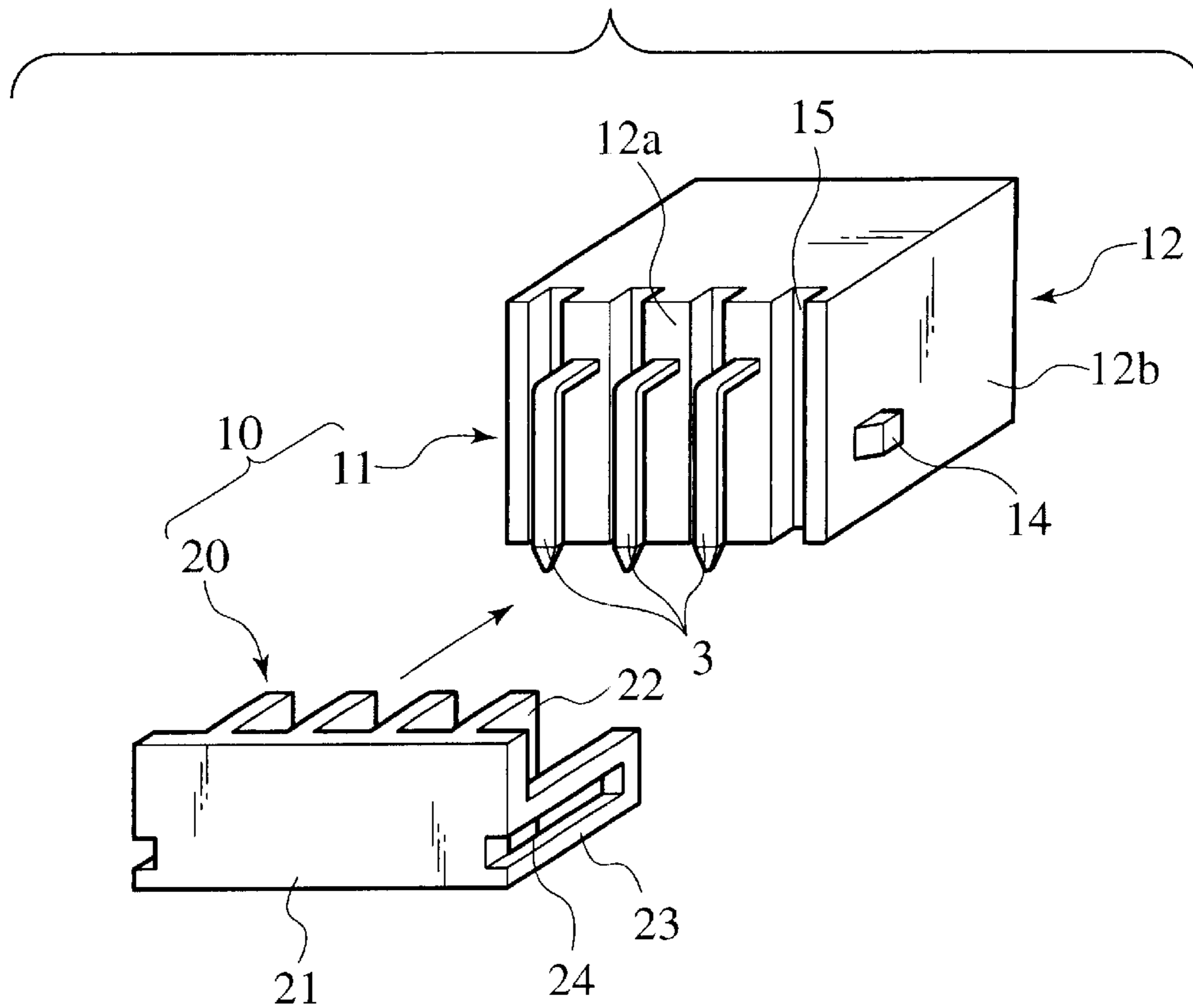


FIG.2B

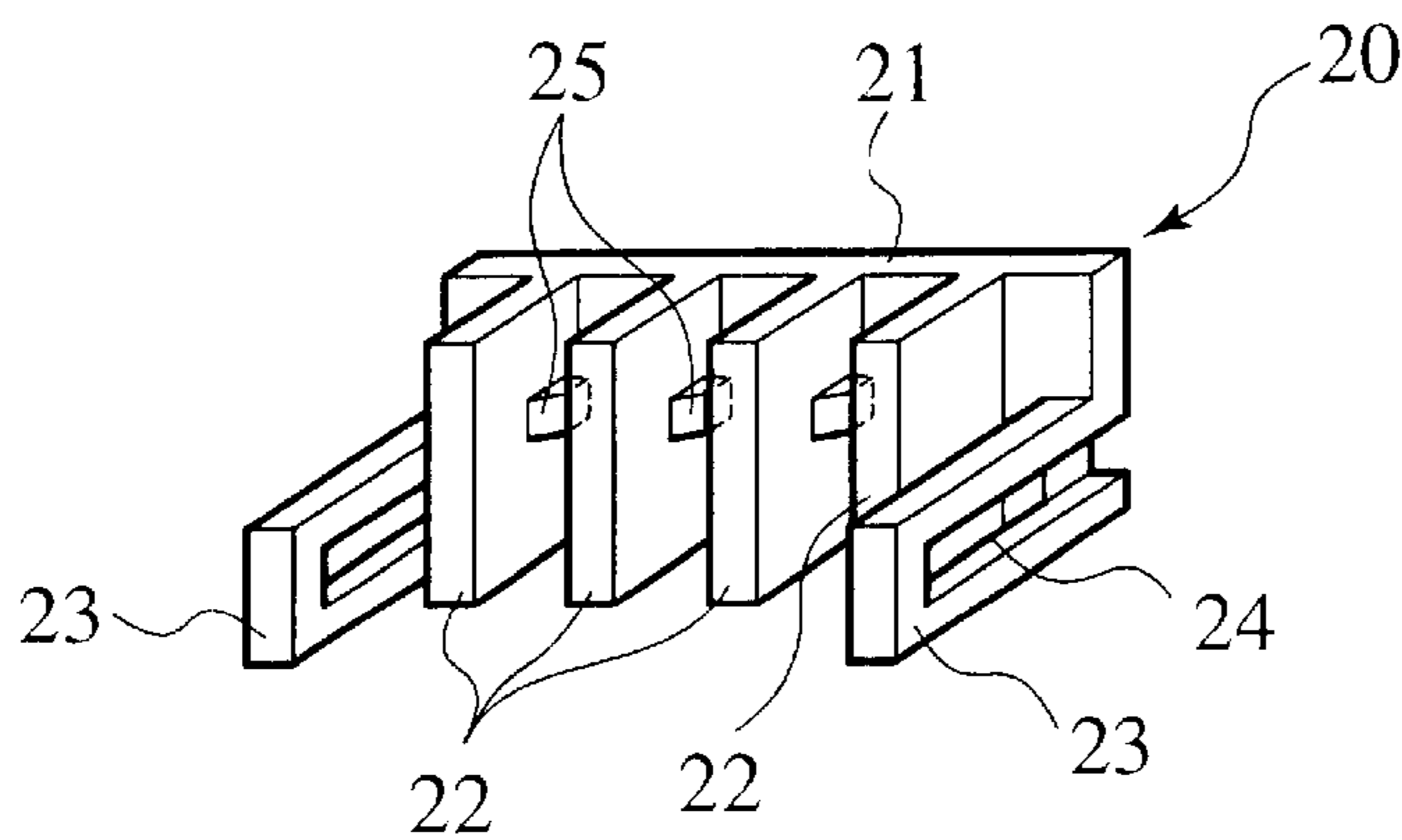


FIG.3A

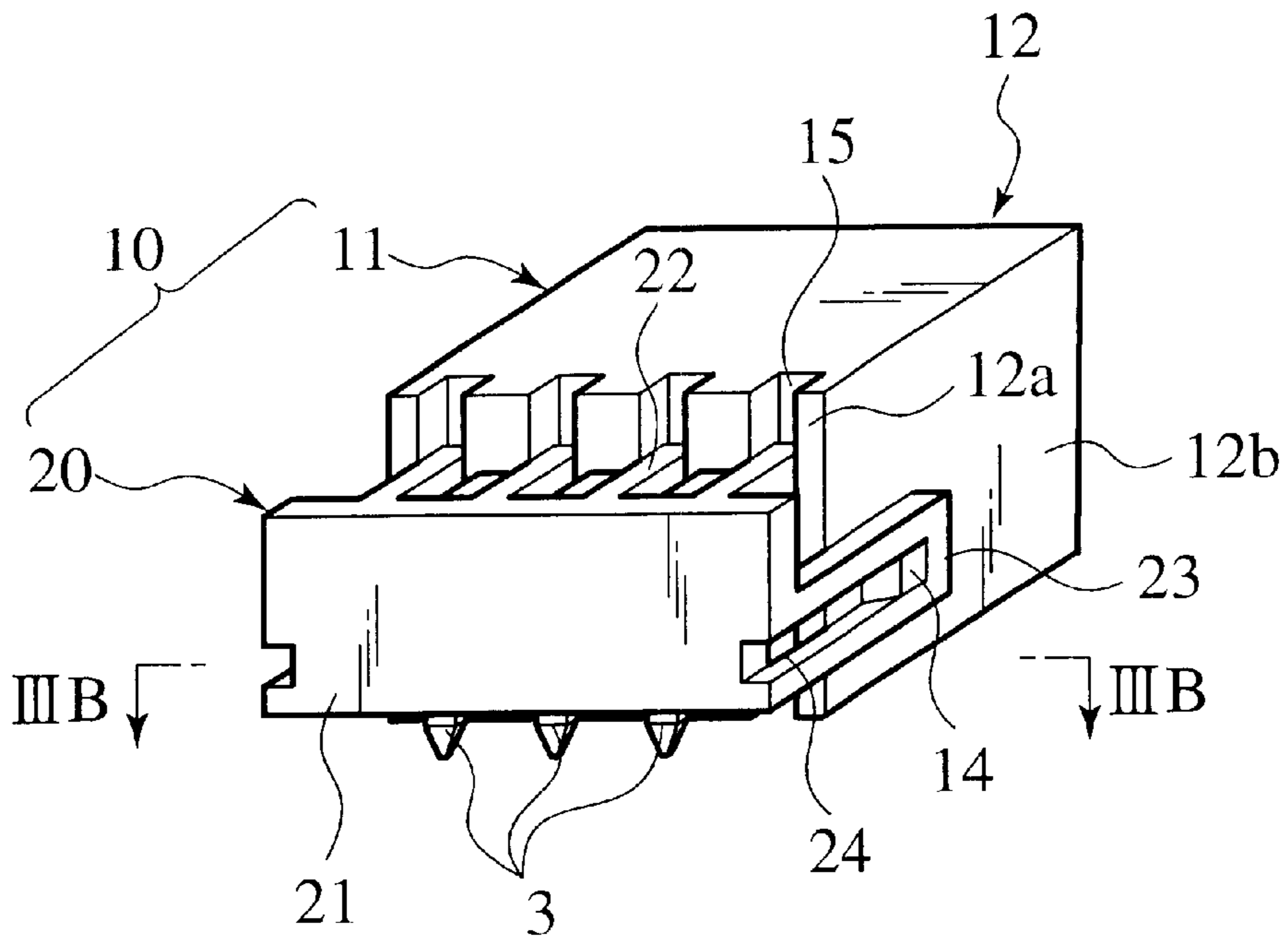
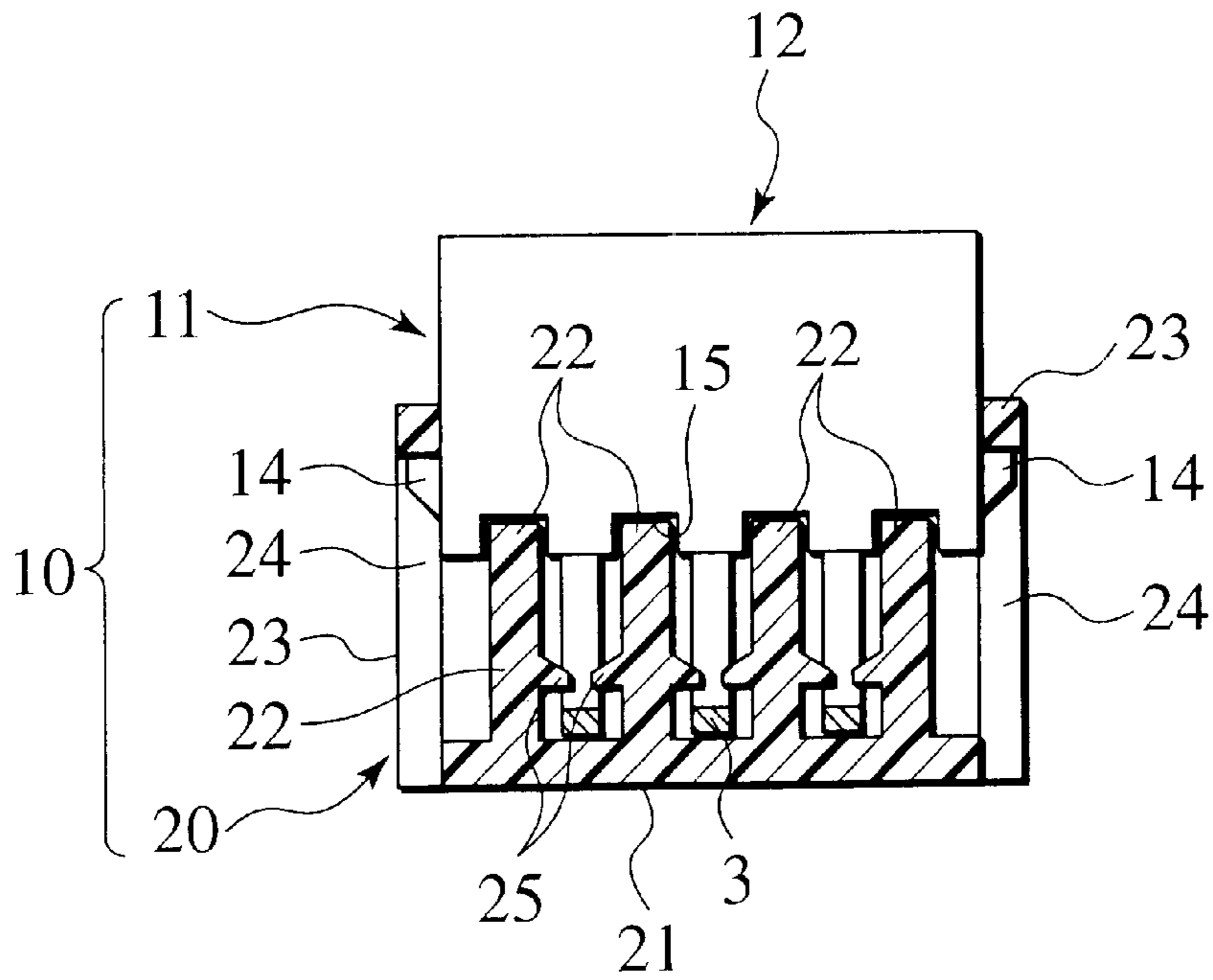


FIG.3B



## PRINTED CIRCUIT BOARD CONNECTOR

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates to a connector for a printed circuit board connecting an opposite connector to the printed circuit board by attaching the connector to the printed circuit board.

#### 2. Description of the Related Art

As connectors attached to printed circuit boards, there is known a connector shown in FIG. 1. This connector **1** consists of a connector housing **2** and a plurality of terminals **3**. The front surface side (the other side in FIG. 1) of the connector **1** is connected to an opposite connector and the terminals **3** for connecting the connector **1** to the printed circuit board protrude from the rear surface side of the connector **1**. One end portion of each terminal **3** fitted into the terminal of the opposite connector is located inside of the connector housing **2** and the other end portion thereof protrudes outside from the rear wall surface **2a** of the connector housing **2**.

The other end portion of each terminal **3** protruding outside, protrudes perpendicularly from the rear wall surface **2a**, bends into an L shape parallel to the rear wall surface **2a** and extends in the bottom direction of the connector housing **2**. The aligned tip ends of the terminals **3** are connected to the conductor of the printed circuit board, whereby the connector **1** can be attached to the printed circuit board.

Meanwhile, if the above-stated connector **1** is used in a high-voltage current circuit, the distances among adjacent terminals are insufficiently short and the insulation performance among the terminals disadvantageously deteriorates. This is because the distances among adjacent terminals **3** are restricted so that the terminals **3** connected to the printed circuit board are arranged linearly. In addition, since the L-shaped terminals **3** are exposed outside, the terminals **3** tend to be bent by an external force. If bent, it becomes disadvantageously difficult to carry out an operation for attaching the terminals **3** to the printed circuit board.

### SUMMARY OF THE INVENTION

It is, therefore, an object of the present invention to provide a printed circuit board connector capable of enhancing the insulation performance among terminals and preventing the terminals from being bent.

The first aspect of the invention provides a printed circuit board connector comprising: a connector housing; a plurality of the terminals each protruding outside from a rear wall surface of the connector housing, having a tip end portion bent into an L shape in parallel to the rear wall surface and thereby aligned; and a terminal cover detachably attached to the connector housing so as to cover the terminals protruding from the rear wall surface of the connector housing, and insulating the terminals from one another by an insulating wall provided on the terminal cover.

According to this invention, the terminal cover is attached to the connector housing only if necessary, so that the insulating wall of the terminal cover can enhance the insulation performance among the terminals and it is possible to protect the terminals.

According to the second aspect of the invention, there is provided a printed circuit board connector according to the first aspect of the invention wherein a groove is formed on the rear wall surface of the connector housing, and a tip end of the insulating wall is fitted into the groove.

According to this invention, the tip end of the insulating wall protruding from the terminal cover is fitted into the groove formed on the rear wall surface of the connector housing. Thus, it is possible to eliminate a gap between the insulating wall and the connector housing and to ensure insulating the terminals from one another up to the roots thereof.

According to the third aspect of the invention, there is provided a printed circuit board connector according to the first aspect of the invention wherein an engagement protrusion for restricting positions of the terminals by being engaged with the terminals, is provided on a wall surface of the insulating wall.

According to this invention, the positions of the terminals are restricted by engagement protrusions provided on the wall surface of the insulating wall. Thus, it is possible to maintain the arrangement of the terminals in a correct state.

According to the fourth aspect of the invention, there is provided a printed circuit board connector according to the first aspect of the invention wherein locking protrusions are provided on left and right wall surfaces of the connector housing, respectively and locking arms are provided on both sides of the terminal cover, respectively; and connecting the connector housing to the terminal cover is secured by engaging the locking protrusions with the locking arms.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a conventional printed circuit board connector;

FIGS. 2A and 2B are block diagrams of a printed circuit board connector in one embodiment according to the present invention, where FIG. 2A is a perspective view showing a state before a terminal cover is attached to a connector housing and FIG. 2B is a perspective view showing the internal constitution of the terminal cover; and

FIGS. 3A and 3B are block diagrams of the printed circuit board connector in the embodiment according to the present invention, where FIG. 3A is a perspective view showing a state in which the terminal cover has been attached to the connector housing and FIG. 3B is a cross-sectional view along line IIIB—IIIB of FIG. 3A.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

One embodiment of the present invention will be described hereinafter with reference to the drawings.

The printed circuit board connector **10** shown therein comprises a connector body **11** and a terminal cover **20** attached to the connector body **11** at need.

The connector body **11** comprises a connector housing **12** and a plurality of terminals **3**. The front surface side (the other side in the drawings) of the connector body **11** is connected to an opposite connector and the terminals **3** for connecting the connector **10** to a printed circuit board protrude on the rear surface of the connector body **11**. One end portion of each terminal **3** fitted into the terminal of the opposite connector is located inside the connector housing **12** and the other end portion thereof protrudes outside from the rear wall surface **12a** of the connector housing **12**.

The other end portion of each terminal **3** protruding outside, protrudes perpendicularly from the rear wall surface **12a**, bends into an L shape in parallel to the rear wall surface **12a** and extends in the bottom direction of the connector housing **12**. The aligned tip ends of the terminals **3** are connected to the conductor of the printed circuit board,

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whereby the connector body **11** can be attached to the printed circuit board.

The constitution of the connector body **11** described above is the same as that of the conventional connector **1** shown in FIG. **3**. The connector body **11** differs from the conventional connector **1** in that a groove **15**, which is located between the terminals **3** aligned sideways and which longitudinally extends, is provided in the rear wall surface **12a** and that a locking protrusion **14** for fixing the terminal cover **20** is provided on the side wall surface **12b** of the connector housing **12**.

On the other hand, the terminal cover **20** is detachably attached to the connector housing **12** so as to cover the terminals **3**. The terminal cover **20** has a cover wall **21** facing to the rear wall surface **12** at a certain distance when attaching the terminal cover **20** to the connector housing **12**, a plurality of insulating walls **22** provided on the inner surface of the cover wall **21** and insulating adjacent terminals **3**, and a pair of locking arms provided on right and left sides of the cover wall **21**, respectively.

An engagement protrusion **25**, which restricts the positions of the terminals **3** by being engaged with the terminals **3** when attaching the terminal cover **20** to the connector housing **12**, is provided on the terminal **3**—sidewall surface of each insulating wall **22**. Further, a locking hole **24** engaged with the locking protrusion **14** is provided in each locking arm **23**.

To attach the terminal cover **20** to the connector body **11**, the terminal cover **20** is arranged to cover the terminals **3**, the locking arm **23** is slid on the side wall surface **12b** and the locking hole **24** is engaged with the locking protrusion **14**. At the same time, the tip ends of the insulating walls **22** are fitted into the groove **15** of the rear wall surface **12a**, thereby insulating the adjacent terminals **3** from one another.

If the terminal cover **20** is attached to the connector body **11** as stated above, the engagement protrusions **25** provided on the wall surfaces of the insulating walls **22** are engaged with the terminals **3**, thereby holding the respective terminals at fixed positions. Therefore, the terminal cover **20** can protect the terminals **3** from being applied with an external force and maintain the terminals **3** in a correct arrangement

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state. As a result, the connector **10** can be attached to the printed circuit board more easily and attachment failure can be prevented.

Moreover, since the insulating walls **22** exist among the terminals **3**, the distances among the adjacent terminals **3** are widened, so that the insulation performance among the adjacent terminals **3** is enhanced. Especially, since the tip ends of the insulating walls **22** are fitted into the groove **15** of the connector housing **12**, it is possible to ensure insulating the terminals **3** from one another up to the roots thereof.

What is claimed is:

1. A printed circuit board connector comprising:

a connector housing having a rear wall surface with a plurality of grooves spaced away from each other;  
 a plurality of terminals respectively protruding from said rear wall surface between the grooves, each of the terminals being of inverted L-shaped configuration to define one leg portion normal to the rear surface and another leg portion parallel to the rear surface; and  
 a terminal cover detachably attached to said connector housing so as to cover said terminals protruding from said rear wall surface of said connector housing, and having a plurality of insulating walls, each of the walls is located respectively between said terminals for insulating said terminals from one another, wherein each of the walls is received in one of the corresponding said grooves.

2. A printed circuit board connector according to claim 1, wherein engagement protrusions for restricting positions of said terminals by being engaged with said terminals, is provided on a wall surface of said plurality of insulating walls.

3. A printed circuit board connector according to claim 1, wherein locking protrusions are provided on left and right wall surfaces of said connector housing, respectively and locking arms are provided on both sides of said terminal cover, respectively; and connecting said connector housing to said terminal cover is secured by engaging said locking protrusions with said locking arms.

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